

## THE CLAIMS

### What is claimed is:

- 5 1. A non-activated tissue-regeneration polypeptide (TRP) containing:
- (a) a protein transduction domain (PTD) making the polypeptides to permeate cell membranes without cell membrane receptors;
  - (b) a furin activation domain (FAD) which has at least one proprotein convertase cleavage site and is cleaved by the proprotein convertase to activate
  - 10 tissue regeneration domain (TRD) in cells; and
  - (c) a non-activated TRD which is activated by the proprotein convertase cleavage of the FAD, and which stimulate the growth or formation of tissues or to induce the regeneration of tissues.
- 15 2. The non-activated TRP according to claim 1, wherein the proprotein convertase is furin.
3. The non-activated TRP according to claim 1, which has no three-dimensional stereoregularity and has no biological activity itself.
- 20 4. The non-activated TRP according to claim 1, wherein the proprotein convertase cleavage site of the FAD is cleaved by proprotein convertase present in living cells, whereby the TRD is activated, and the activated TRD is secreted extracellularly.
- 25 5. The non-activated TRP according to claim 1, wherein the TRD to be cleaved by proprotein convertase is selected from the group consisting of BMPs, TGF- $\beta$ ,  $\beta$ -NGF (  $\beta$  -nerve growth factor),  $\beta$  -amyloid, ADAMs (a disintegrin and metalloproteinase-like), TNF- $\alpha$ , MMPs (matrix metalloproteinases), and insulin-like growth factor (IGF-1).

6. The non-activated TRP according to claim 1, wherein the TRD is an amino acid sequence selected from the group consisting of SEQ ID NOs: 1 to 13.
7. The non-activated TRP according to claim 1, wherein the FAD is an amino acid sequence selected from the group consisting of SEQ ID NOs: 14 to 26.
8. The non-activated TRP according to claim 1, wherein the PTD is selected from the group consisting of TAT, drosophila melanogaster-derived Antp peptide, VP22 peptide and mph-1-btm.
9. The non-activated TRP according to claim 1, which is in the form of fusion polypeptide of PTD, FAD and TRD.
10. A recombinant vector inserted with an FAD-encoding base sequence in front of the 5' region of TRD-encoding DNA, a PTD base sequence, a base sequence for tagging, and at least four histidine-encoding base sequences for separation and purification
11. A transformed bacteria with the recombinant vector of claim 10.
12. A method for preparing non-activated TRP, comprising the steps of:
- (a) culturing the transformed bacteria of claim 11 to express a [PTD-FAD-TRD] polypeptide; and
  - (b) centrifuging the culture broth, and then removing the two-dimensional or three-dimensional structure of the polypeptide or converting the two-dimensional or three-dimensional structure to one-dimensional linear structure by addition of urea solution into the supernatant and cell pellet, and then purifying the [PTD-FAD-TRD] polypeptide.
13. The method for preparing non-activated TRP according to claim 12, wherein the

TRD to be cleaved by proprotein convertase is selected from the group consisting of BMPs, TGF- $\beta$ ,  $\beta$ -NGF ( $\beta$ -nerve growth factor),  $\beta$ -amyloid, ADAMs (a disintegrin and metalloproteinase-like), TNF- $\alpha$ , MMPs (matrix metalloproteinases), and insulin-like growth factor (IGF-1).

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14. The method for preparing non-activated TRP according to claim 12, wherein the TRD is an amino acid sequence selected from the group consisting of SEQ ID NOs: 1 to 13.

10 15. The method for preparing non-activated TRP according to claim 12, wherein the FAD is an amino acid sequence selected from the group consisting of SEQ ID NOs: 14 to 26.

15 16. The method for preparing non-activated TRP according to claim 12, wherein the PTD is selected from the group consisting of TAT, drosophila melanogaster-derived Antp peptide, VP22 peptide and mph-1-btm.

17. The method for preparing non-activated TRP according to claim 12, wherein the purification step comprises the sub-steps of binding the polypeptide to nickel-  
20 titanium beads, washing the beads with the same solution, and then eluting the beads with imidazole and a high-salt buffer solution.

18. A composition for stimulating the formation or regeneration of tissue, containing the non-activated TRP of any one claim among claims 1~9, as an active  
25 ingredient.

19. The composition according to claim 18, wherein the tissue is bone or cartilage.

20. The composition according to claim 19, which further contains the growth

factor selected from the group consisting of TGF- $\beta$ , IGF, PDGF, and FGF.

21. A composition for improving the fibrosis or cirrhosis of organs, containing the non-activated TRP of any one claim among claims 1~9, as an active ingredient.

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22. The composition according to claim 21, which further contains the growth factor selected from the group consisting of TGF- $\beta$ , IGF, PDGF, and FGF.